

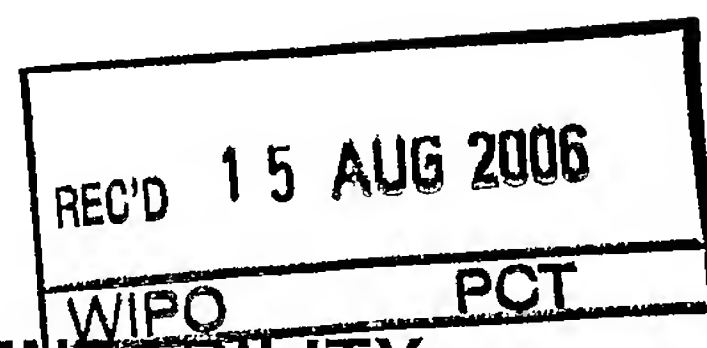
PATENT COOPERATION TREATY


PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference 16332/PCT	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/EP2005/003677	International filing date (day/month/year) 07.04.2005	Priority date (day/month/year) 08.04.2004	
International Patent Classification (IPC) or national classification and IPC INV. G01N15/06 C12M1/34 G01N27/22 G01N27/02 B01L3/00			
Applicant EVOTEC TECHNOLOGIES GMBH et al.			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 10 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 9 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input checked="" type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input checked="" type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 27.01.2006		Date of completion of this report 14.08.2006	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Bravin, M Telephone No. +49 89 2399-2417	



INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2005/003677

Box No. I Basis of the report

1. With regard to the **language**, this report is based on
- ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))
2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

Description, Pages

1-28 as originally filed

Claims, Numbers

1-44 received on 27.01.2006 with letter of 27.01.2006

Drawings, Sheets

1/14-14/14 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2005/003677

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 30-36

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed (*specify*).

☒ no international search report has been established for the said claims Nos. 30-36

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13*ter*.1(a) or (b) and 13*ter*.2.

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions, and such tables were not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in electronic form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☒ See separate sheet for further details

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2005/003677

Box No. IV Lack of unity of invention

1. ☐ In response to the invitation to restrict or pay additional fees, the applicant has, within the applicable time limit:
- ☐ restricted the claims.
 - ☐ paid additional fees.
 - ☐ paid additional fees under protest and, where applicable, the protest fee.
 - ☐ paid additional fees under protest but the applicable protest fee was not paid.
 - ☐ neither restricted the claims nor paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is:
- ☐ complied with.
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 1-29, 37-44 .

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-29, 37-44
	No: Claims	
Inventive step (IS)	Yes: Claims	37-44
	No: Claims	1-29
Industrial applicability (IA)	Yes: Claims	1-29, 37-44
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2005/003677

Box No. VI Certain documents cited

1. Certain published documents (Rule 70.10)
and / or
2. Non-written disclosures (Rule 70.9)
see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

Claims 30-36: Rule 66.1(e) PCT.

Re Item IV

Lack of unity of invention

This Authority considers that there are 2 inventions covered by the claims indicated as follows:

- I: Claims 1-29, 37-44 directed to various electrode arrangements for field cages and the use thereof
- II: Claims 30-36 directed to the structure of a fluidic system

The reasons for which the inventions are not so linked as to form a single general inventive concept, as required by Rule 13.1 PCT, are as follows:

The subject-matter of independent claim 1 is not inventive (see the grounds for this objection). The requisite unity of invention (Rule 13.1 PCT) therefore no longer exists inasmuch as a technical relationship involving one or more of the same or corresponding special technical features in the sense of Rule 13.2 PCT does not exist between the subject-matter of the following groups of dependent claims:

Group 1: claims 2-29

Group 2: claims 30-36

Specifically, claims 2-29, interpreted according to the description, define embodiments of a field cage according to Figs. 1-2,4,5,6 while claims 30-36 define a fluidic structure according to Fig. 9. Said groups of claims do not have any common or corresponding special technical features.

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1.

Reference is made to the following documents:

- D1: US 2004/053211 A1 (GRADL GABRIELE ET AL) 18 March 2004 (2004-03-18)
D2: REICHLE A C ET AL: "A new microsystem for automated electrorotation
measurements using laser tweezers" BIOCHIMICA ET BIOPHYSICA ACTA.
BIOENERGETICS, AMSTERDAM, NL, vol. 1459, no. 1, 20 July 2000 (2000-07-20),
pages 218-229, XP004272832 ISSN: 0005-2728
D3: SCHNELLE T ET AL: "Combined dielectrophoretic field cages and laser tweezers for
electrorotation" APPLIED PHYSICS B, vol. 70, 2000, pages 267-274, XP002332854
SPRINGER-VERLAG
D4: WO 03/020125 A (FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER
ANGEWANDTEN FORSCHUNG E.V;) 13 March 2003 (2003-03-13)

2.

**The present application does not meet the criteria of Article 33(1) PCT, because the
subject-matter of claim 1 does not involve an inventive step in the sense of Article
33(3) PCT.**

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (the references in parentheses applying to this document):

A measuring device for investigating particles which are suspended in a carrier liquid (see Abstract and [0027], D1), comprising two or more electrodes for carrying out electrical measuring of the particles, and a trapping element for fixing the particles for electrical measuring (see [0044]-[0045] or [0071]-[0073], D1).

The subject-matter of claim 1 therefore differs from this known device in that the trapping element is defined as being a field cage comprising several cage electrodes, while in D1

the trapping element is preferably an optical trap (especially optical tweezers), see [0032] and [0044], D1).

The problem to be solved by the present invention may therefore be regarded as providing an alternative trapping element in the context of D1.

The solution proposed in claim 1 cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

D1 discloses the following ideas:

- (i) performing electrorotation AND impedance spectroscopy on trapped cells (see [0073], D1); and
- (ii) using an microelectrode field cage (e.g. an octopole) for generating electrorotation (see [0082] and [103], D1).

Yet it is known from D3 that microelectrode octopole field cages can be used for simultaneously providing electrorotation AND stable trapping, see p. 268, col. 1, line 1 - col. 2, line 2 and Fig. 1(a), D3. An octopole field cage thus represents an obvious solution to the aforementioned problem and its implementation in D1 by the skilled person would lead to the subject matter of claim 1 without an inventive step being involved.

3.

In the context of documents D1-D4, and further taking into account the knowledge of a person skilled in the art, dependent claims 2-29 do not appear to contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Art. 33(3) PCT).

4.

Claim 37 meets the requirements of Art. 33(1)(2)(3) PCT in respect of novelty and inventive step, the reasons being as follows:

Claim 37 notably differs from closest prior art D1 through step d), defining that *"several of the cage electrodes form measuring electrodes, wherein a measuring current is supplied*

**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

International application No.

PCT/EP2005/003677

by way of at least two of the measuring electrodes, while a measuring voltage is measured by means of at least two of the measuring electrodes". Such dual use of field cage electrodes is not disclosed nor derivable from the teaching of D2 or D3, while the impedance measuring system disclosed in D4 is not constituted by field cage electrodes. Document D5 is even less relevant as it discloses a measurement system of the Coulter type.

The subject matter of claim 37 is thus novel and inventive.

5.

Claims 38-44 are dependent on claim 37 and as such also meet the requirements of Art. 33(1)(2)(3) PCT in respect of novelty and inventive step.

Re Item VI

Certain documents cited

Certain published documents

Application No Patent No	Publication date (day/month/year)	Filing date (day/month/year)	Priority date (valid claim) (day/month/year)
WO2005045400	19/05/2005	10/11/2004	10/11/2003

The content of this document is prejudicial to the novelty of claim 1.

Re Item VII

Certain defects in the international application

Formulation of the claims: Features in bracket do not limit the scope of protection. See especially claim 9 in this respect ("*two of the cage electrodes*").

Re Item VIII

Certain observations on the international application

**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

International application No.

PCT/EP2005/003677

1.

The terms "*measuring electrode(s)*" employed in the apparatus claims, without further specification, are vague and unclear and do not allow the skilled person to properly delimitate the scope of protection (Art. 6 PCT). For instance, octopole microelectrodes as used in D1 (see [0083], D1) can be considered as "*measuring electrodes for carrying out electrical measuring of the particles*" according to claim 1 since they allow electrorotation measurements to be performed.

2.

Claim 11 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

3.

Claim 20 is redundant in view of claims 18 and 19, hence lack of conciseness (Art. 6 PCT).